

**UNIVERSITY OF ESWATINI**  
**DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND**  
**PLANNING**

**RE-SIT EXAMINATION-JANUARY 2020**

**B.A., BASS, B.Ed. & B.Sc.**

**TITLE OF PAPER: RESEARCH METHODS**

**COURSE CODE: GEP313**

**TIME ALLOWED: THREE (3) HOURS**

**INSTRUCTIONS:**

- 1. ANSWER THREE (3) QUESTIONS**
- 2. QUESTION 1 IS COMPULSORY**
- 3. ANSWER ANY TWO QUESTIONS FROM SECTION B**
- 4. WHERE APPROPRIATE, ILLUSTRATE YOUR ANSWER WITH DIAGRAMS AND EXAMPLES**

**MARKS ALLOCATION: QUESTION ONE (1) CARRIES 40 MARKS. THE REST OF THE QUESTIONS CARRY 30 MARKS EACH.**

**THIS QUESTION PAPER SHOULD NOT BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR**

**GEP313: RESEARCH METHODS RE-SIT EXAMINATION– JANUARY 2020**

**SECTION A: COMPULSORY**

**QUESTION 1**

- a) Define the following terms:
- i) Causal relationship or causality in research
  - ii) Scientific research
  - iii) Applied research
- (6 marks)
- b) With examples, explain any three ways of acquiring knowledge in research. (12 marks)
- c) Discuss any four goals of scientific research. (12 marks)
- d) Why are ethics an important consideration when conducting scientific research? (4 marks)
- e) Using examples, discuss any three ways of making conclusions using inductive reasoning. (6 marks)
- (40 Marks)**

**SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION**

**QUESTION 2**

- a) As a road and transport researcher, you have been asked to estimate the distance travelled by drivers before being involved in a traffic crash in the Mbabane-Manzini highway every three months. After conducting research, you find that the standard deviation of the distance travelled before a traffic crash every three months is about 45 km. You then consider taking a random sample of 85, 250 and 500 traffic crashes.
- i) Estimate the standard error of each of the samples. (6 marks)
  - ii) How do the standard errors explain why large samples are more reliable? (2 marks)
  - iii) In the sample of 500 traffic crashes, you find the proportion of fatalities to be 215 out of 500. Calculate the 95% confidence interval in which the true proportion of fatal traffic crashes is likely to lie. (4 marks)

b) Consider the following sample distribution of daily flight range of a mosquito.

187 m, 173 m, 182 m, 179 m, 163 m, 250 m, 166 m, 176 m, 178 m, 179 m

- i) In a sample distribution what would prompt a researcher to report the median instead of the arithmetic mean? (2 marks)
  - ii) Calculate the median and range of the above sample distribution (2 marks)
  - iii) Calculate the standard error of the above sample distribution. (12 marks)
  - iv) What does the standard error of a sample distribution mean? (2 marks)
- (30 Marks)**

### QUESTION 3

a) In a sample of 95 households at Ezulwini, a researcher found that the mean and standard deviation of their head of household incomes in Emalangeneni were E5000 and E1200 respectively.

- i) Calculate the 95% confidence interval in which the true mean of all households income at Ezulwini is likely to lie. (5 marks)
- ii) Similarly, the researcher wanted to know if the head of household has reached tertiary education or not and he found that 63 out of 95 (63/95) heads of households have reached tertiary education level. Construct a 95% confidence interval in which the true proportion of all heads of households who reached tertiary education level at Ezulwini is likely to lie. (5 marks)
- iii) The above method assumes a normal distribution of the data with a t-distribution of 1.96. What should be the minimum sample size for a researcher to assume that the data is normally distributed and how can he estimate the quantity of  $t$  if the data is less than the minimum sample size? (2 marks)

b) Explain the following terms as used in reference to the instruments used for measurement:

- i) Validity (2 marks)
- ii) Reliability (2 marks)

c) Define the following data types:

- i) Nominal variables (2 marks)
- ii) Ordinal variables (2 marks)
- iii) Binary variables (2 marks)
- iv) Continuous variables (2 marks)
- v) Discrete variables (2 marks)

d) Describe any two different ways that are used to analyze and present both qualitative and quantitative data. (4 marks)

**(30 Marks)**

#### **QUESTION 4**

Discuss any five factors a researcher must consider when selecting a research problem.

**(30 Marks)**

#### **QUESTION 5**

Using examples, discuss the difference between descriptive and analytical research studies.

**(30 Marks)**

## Appendix

### Formulae

#### Mean

$$CI = [ \bar{x} - 1.96*SE, \bar{x} + 1.96*SE ]$$

$$SE = \frac{s}{\sqrt{n}}$$

$$s^2 = [(x_1 - \bar{x})^2 + \dots + (x_n - \bar{x})^2] / (n-1)$$

#### Proportion

$$[ p - 1.96*SE, p + 1.96*SE ], \text{ where } SE = \sqrt{\frac{p(1-p)}{n}}$$